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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,935	03/30/2004	Atsushi Sadamoto	251132US2RD	2914

22850 7590 01/26/2006

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EXAMINER	
KITOV, ZEEV	

ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/811,935	SADAMOTO ET AL.	
	Examiner	Art Unit	
	Zeev Kitov	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 5, 7 - 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 5, 7 - 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *09/22/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Examiner acknowledges a submission of the amendment and arguments filed on November 07, 2005. Claim 6 is cancelled. Claims 3 – 5 are amended. New Claims 12 – 20 are added.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 – 5, 7 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vanhee (US 6,741,437) in view of Nunnally (US 5,869,200). Regarding Claims 1, 9 and 10, Vanhee discloses following elements of the claim including: the protection circuit for a battery stack including: a detection unit (8 in Fig. 2) detecting abnormality of a potential difference between positive and negative electrodes of at least one cell of the battery stack; and a bypass unit forming bypass current path between the positive and negative electrodes (6 in Fig. 2), the bypass unit being operative when the detection unit detects the abnormality of the potential difference (col. 3, line 61 – col. 4, line 14). However, Vanhee does not disclose the fuel cell battery. Nunnally discloses bypassing individual units of the fuel cell battery (elements 48 in Fig. 10, col. 11, line 64 – col.12, line 17). Both references have the same problem solving area, namely

providing battery cells protection. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Kitahara et al. solution by extending a protection of the battery cells to the fuel cells according to Nunnally, because (I) as Nunnaly states (col. 12, lines 14 – 17), the fuel cells need bypassing protection to eliminate electrolyte evaporation and heating, and (II) such modification would help to manufacturers of the Vanhee system to expand their market capacity.

Regarding Claim 2, Vanhee discloses the bypass unit including a switching device (6 in Fig. 2) conducting an electric current when the detection unit detects the abnormality of the potential difference, the switching device being connected to the cell in parallel (col. 3, line 61 – col. 4, line 14).

Regarding Claim 7, Vanhee discloses the battery stack of cells including a series of plural unit cells (1, 1' and 1" in Fig. 8).

Regarding Claim 8, as evident from Vanhee Specification (col. 2, lines 61 – 67), it discloses plural detection units respectively detecting abnormality of potential differences between the positive and negative electrodes of the plural unit cells, the bypass unit being operative when at least one of the plural detection units detects the abnormality of the potential difference (col. 3, line 61 – col. 4, line 14).

Regarding Claim 11, as evident from Vanhee Specification (col. 2, lines 61 – 67), it discloses plural detection units respectively detecting abnormality of potential differences between the positive and negative electrodes of the plural unit cells,

the plural unit battery cells (1, 1' and 1" in Fig. 2) being connected in series and constituting a part of the cell stack (eventually can be extended); and a bypass unit (6, 3 and 4 in Fig. 2) forming bypass current path between both ends of the series of the plural unit cells, the bypass unit being operative when at least one of the plural detection units detects the abnormality of the potential difference (col. 3, line 61 – col. 4, line 14).

Regarding Claim 12, Vanhee discloses the system, which includes comparison with a threshold value (col. 3, line 61 – col. 4, line 14), and which detects the abnormality when the potential difference goes below the threshold (2.5V for lithium-ion cells).

Regarding Claims 13, 15 and 18, Vanhee discloses the bypass unit short-circuiting the positive electrode wand the negative electrode thus forming the bypass path (through switch 6 in Fig. 2).

Regarding Claims 14 and 17, Vanhee discloses the detection unit (8 in Fig. 2) comparing the potential difference with a threshold value thus detecting abnormality when the potential difference goes below the threshold (col. 3, line 61 – col. 4, line 14).

As per Claim 16, it combines together the limitations of Claims 14 and 15, each limitation has been addressed above.

Regarding Claim 19, Vanhee discloses the trigger device (7' in Fig. 3) controlling the short-circuiting bypass (6 in Fig. 2). In a case of abnormal voltage detection, the trigger device activates the switch based on heating the heat sensitive member, which activates the short-circuiting bypass accordingly (col. 5, lines 9 – 20). It is evident that if the abnormal potential difference is not detected the bypass current is not activated.

Regarding Claim 20, in the Vanhee system, when the abnormal voltage across the battery cell is detected by the trigger device (5' in Fig. 3), the bypass current is set by the heat sensitive element (by element 4' in Fig. 3); after some period of time the detection device will get cool, the bypass will be cut off.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vanhee in view of Nunnally and Townsley et al. (US 5,666,006). Claim 4 differs from Claim 1 rejected above by its limitation of the first switching device connected in series to the cell. Townsley et al. disclose the switches (56 and 59 in Fig. 4) connected between the batteries (57 and 60 in Fig. 4) and the load (43 in Fig. 4), i, e. connected to the battery cells in series. Both references have the same problem solving area, namely battery power supply to the load. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Vanhee solution by adding the series switch according to teachings of Townsley et al., because as Townsley et al. state (col. 7, line 32 – col. 8, line 49), it is necessary to provide simultaneous charge and sequential discharge of plural batteries normally used in the computer environment.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vanhee in view of Nunnally and Townsley et al. (US 5,666,006) and Ford et al. (US 3,454,859). As per Claim 3, it differs from Claim rejected above by its limitation of the bypass unit having a level conversion driver. Regarding Claim 3, Ford discloses the shunting

element as transistors (19A – 19E in Fig. 1). Both references have the same problem solving area, namely providing controllable battery power supply. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Vanhee solution by replacing the mechanical switches by semiconductors according to teachings of Ford, because as of well known in the art advantages of semiconductors with respect to mechanical switches, such as et least reliability. Townsley et al. disclose the battery switching circuit having the level conversion (level shift) arrangement (50 in Fig. 5). As well known in the art, when switching ungrounded transistors by some referenced to the ground control signal, the level conversion/shifting is necessary. In Towndley et al. circuit the control signal is provided by the analog/digital converters (44 in Fig. 4), which are inherently grounded and provide the control signal referenced to the ground. However, since the potential of the transistor's sources is generally unknown the voltage converter/shifter (50 in Fig. 5) converts the high voltage level of the control signal to the level of the switching transistor source, i.e. to a level of the battery voltage. In the Ford system, if the control unit (14 in Fig. 1) is semiconductor-based circuit such as microcontroller, there is similar problem, i.e. the control signal to shunting transistors must be converted/shifted to accommodate the control signal level to a voltage level of particular cell to be switched. It is clear therefore, that the grounded cell does not need the voltage converter/shifter. Both references have the same problem solving area, namely providing controllable and reliable battery power supply. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Vanhee solution

by adding the voltage converter/shifter circuit according to teachings of Townsley et al., because the value of the grounded control signal is to be converted/shifted to the voltage value of the particular switched cell.

As per Claim 5, it differs from Claim 3 rejected above by its limitation of the first switch having the voltage converter/shifter. Townsley et al. discloses the first switch having the voltage converter/shifter (50 in Fig. 5). A motivation for modification of the primary reference is the same as above.

Response to Arguments

Applicant's Arguments have been given careful consideration but they are mostly moot in view of new ground of rejection. However, some of them are to be addressed.

Applicant in his Arguments attacks a secondary reference, Nunnaly, alleging that it does not disclose a fuel cell. To support his allegations, Applicant recites McGraw Hill Dictionary of Scientific and Technical Terms, (Fifth Edition), to create impression that only kerosene or industrial fuel gas can be used in the fuel cell. Since Nunally does not recite kerosene or industrial fuel gas, Applicant concludes that the Nunally device is not the fuel cell.

According to Authoritative Dictionary of IEEE Standard Terms (seventh Edition): Fuel (fuel cell): A chemical element or compound that is **capable of being oxidated**.

Diotalevy et al. US 3,378,404 provides another essential characteristic of fuel cell process (col. 3, lines 23 – 26): "**In contrast to a voltaic cell, the electrodes of the fuel cell are not consumed**".

Nunally cell fits all these definitions. First, Nunally cell uses fuel to produce electricity (see at least Abstract). Second, the fuel in his cell undergoes process of oxidation (for example, col. 12, lines 31 – 34). Third, the electrodes in his fuel cell are not consumed (col. 8, lines 6 – 12). Therefore, the Nunally reference does disclose the fuel cell.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 – 2800, Ext. 36. The fax phone number for organization where this application or proceedings is assigned is (703) 872-9306 for all communications.

Z.K.
1/16/2006

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